



Focus

Major Air Pollutants Particulate Matter

Background

Particulate matter is particles of soot, dust, and unburned fuel suspended in the air. The smaller particles, less than 10 microns in size, are a public health concern. Thousands of these tiny particles would fit on the period at the end of this sentence. Visible smoke is largely composed of these particles. Although they cannot always be seen because of their small size, enough can still be present to threaten human health.

Particulate matter is a product of many things: soil erosion, road dust, industrial wood waste boilers, wood stoves, slash fires, land clearing fires, agricultural burning, and backyard burning. The federal government regulates particulate matter of a certain size as one of six major air pollutants for which health-based air quality standards have been set.

A new particulate matter standard

The federal Environmental Protection Agency (EPA) standard for particulate matter was set for particles smaller than 10 microns in size (PM_{10}) until concerns about health effects caused by even smaller particles prompted a review of the standard. In response to research that found health effects were occurring even when levels of particulate matter in the air were within the PM_{10} standard, EPA recently revised its particulate matter standard to address particles smaller than PM_{10} . The new standards limits fine particles less than 2.5 microns in size ($PM_{2.5}$) to 65 micrograms per cubic meter of air, averaged over 24 hours; and 15 micrograms per cubic meter of air, averaged over a calendar year. Violations of the standard will be based on an average of three years of air monitoring data. The new standard will not take effect until states have had time to develop a monitoring network and obtain three years of data for $PM_{2.5}$. $PM_{2.5}$ is caused mainly by combustion (diesel-powered vehicles, industry, outdoor burning, and wood stoves).

Particulate matter in Washington

EPA declares areas "nonattainment" when levels of certain air pollutants do not meet federal health-based standards. Washington has seven nonattainment areas for PM_{10} :

- the Olympia-Lacey-Tumwater area
- the Duwamish Valley
- the Kent Valley
- the Tacoma Tideflats
- Yakima
- Wallula
- Spokane

In recent years, each of these areas has met the PM_{10} standard. Action from EPA to remove the nonattainment designation from these areas is pending.

Ecology and local air quality agencies in Washington began officially monitoring for $PM_{2.5}$ in the fall of 1998. When three years of data have been collected, EPA will determine whether to declare any parts of the state nonattainment for $PM_{2.5}$.

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Health effects of particulate matter

Particulate matter larger than 10 microns in size collects in the upper respiratory system (throat and nose) and is eliminated by sneezing, coughing, spitting, or the digestive system. Smaller particulate matter is a more serious health threat. Your body cannot keep the smaller particles out of your lungs. Tiny particles collect in the most remote portions of the lungs, called alveoli - the tiny air sacs where oxygen enters the blood stream.

Once in your body, the tiny particulate matter can cause structural and chemical changes deep in the lungs. These small particles can damage the alveoli and act as carriers for other toxic or carcinogenic materials. Damage can result in scarring, which reduces the ability of the lung to absorb oxygen. Chronic diseases such as emphysema, chronic bronchitis, cancer, and cardiovascular complications of lung damage have been associated with exposure to fine particles. Death rates in U.S. and European cities have increased during air pollution episodes that included increased levels of fine particles. Local studies have also shown a relationship between levels of particulate matter and lung capacity and hospitalization of asthmatic children. Pre-adolescent children, the elderly, and people with pre-existing respiratory diseases are the most susceptible to health problems from particulate matter. In addition to health effects, particulate matter can cause damage to materials and can cause deposits on land and in water.

Controlling particulate matter

The Washington Clean Air Act adopted in 1991 required the Department of Ecology to decrease the amount of small particulate matter in the air through the following:

- A permit program for industrial facilities;
- Stricter wood stove regulations;
- Restricted backyard and land clearing fires;
- Reductions in agricultural burning;
- Decreased traffic and decreased use of single-occupant vehicles; and
- A permitting system to minimize unnecessary agricultural burning.

You can help decrease particulate air pollution by composting yard waste instead of burning it; using a form of heat other than wood heat or making sure your wood stove burns cleanly; obeying burn bans; and using your car less. For more information on these topics, contact Ecology at the telephone number for your area listed below.

For more information

Focus sheets on other major pollutants, as well as on air quality programs, are available from the Washington State Department of Ecology, P.O. Box 47600, Olympia, WA 98504-7600; or by calling the following Ecology staff:

Ann Butler Southwest Regional Office	(360) 407-6334
Larry Altose Northwest Regional Office	(425) 649-7192
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If you have special accommodation needs or require this document in alternative format, please call Tami Dahlgren at (360) 407-6830 (voice); or (360) 407-6006 (TDD only).